

## **NASA SBIR 2015 Phase I Solicitation**

### **A3 Airspace Operations and Safety**

**Lead Center: HQ**

The Airspace Operations and Safety Program (AOSP) seeks innovative and feasible concepts and technologies to enable significant increases in the capacity and efficiency of the Next Generation Air Transportation System (NextGen) while maintaining or improving safety and environmental acceptability. AOSP activities and projects will target system-wide operational benefits of high impact for NextGen both in the arenas of airspace operations and safety management. Projects will be formulated with near-term end dates or deliberative evaluation points consistent with the accomplishment of program-defined Technical Challenges. AOSP aligns with the ARMD Strategic Thrusts of Safe and Efficient Growth in Global Aviation, Enable Real-Time System-Wide Safety Assurance, and Enable Assured Machine Autonomy for Aviation. Distribution of work area across the AOSP project structure is described below.

AOSP is comprised of three projects: Airspace Technology Demonstrations (ATD), Shadow Mode Assessment Using Realistic Technologies for the National Airspace System (SMART-NAS) Test-Bed for Safe Trajectory-Based Operations, and Safe Autonomous Systems Operations (SASO). The three projects are formulated to make major contributions to operational needs of the future through the development and research of foundational concepts and technologies and their analysis, integration, and maturation in relevant, system-level environments. Each of the projects are, much like the airspace system itself, highly integrated and require attention to critical system integration and transition interfaces with the NAS. The Airspace Technology Demonstrations (ATD) Project will accelerate the maturation of concepts and technologies to higher levels of maturity for transition to stakeholders, including research supporting the existing ATD-1:

- Interval Management - Terminal Area Precision Scheduling and Spacing effort.
- Integrated Arrivals/Departures/ Surface Operations.
- Applied Traffic Flow Management.
- Technologies for Assuring Safe Aircraft Energy and Attitude State (TASEAS).

The SMART-NAS Testbed for Safe Trajectory Based Operations Project will deliver an evaluation capability, critical to the ATM community, allowing full NextGen and beyond-NextGen concepts to be assessed and developed. This simulation and modeling capability will include the ability to assess multiple parallel universes, accepts data feeds, allows for live/virtual/constructive- distributed environment, and enable integrated examinations of concepts, algorithms, technologies, and NAS architectures. The Safe Autonomous System Operations (SASO) Project will develop autonomous system concepts and technologies; conduct demonstrations, and transfer application specific matured technologies to increase affordability, efficiency, mobility of goods and passengers, safety, and scalability and mix of airspace operations.

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Proposals for this topic will develop innovative feasible concepts and technologies to enable significant increases in the capacity, efficiency, scalability and cost effectiveness of the Next Generation Air Transportation System (NextGen) while maintaining or improving safety and environmental acceptability.

## Subtopics

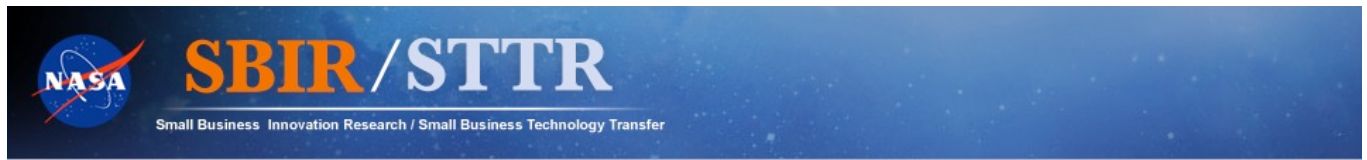
### **A3.03Future Aviation Systems Safety**

**Lead Center: ARC**

**Participating Center(s): LaRC**

The Aeronautics Research Mission Directorate (ARMD) will be concluding the successful Aviation Safety Program (AvSP). The newly expanded Airspace Operations and Safety Program (AOSP) will be succeeding AvSP's significant achievements and stepping up to lead the ARMD research in the area of Real-Time System-Wide Safety Assurance (RSSA). As currently envisioned, ARMD sees its future, safety-related research focused in a forward looking, more comprehensive system-wide direction. Rather than be focused on the current National Airspace System (NAS), ARMD's RSSA will be focused towards a future NAS where a gate-to-gate trajectory-based system capability exists that satisfies a full vision for NextGen and beyond. The ultimate vision for RSSA would enable the delivery of a progression of capabilities that accelerate the detection, prognosis and resolution of system-wide threats. Proposals under this sub-topic are sought, but not limited to, these areas:

- Research and development products to address technologies, simulation capabilities and procedures for reducing flight risk in areas of attitude and energy aircraft state awareness
- Develop V&V tools and techniques for assuring the safety of air traffic applications during certification and throughout their lifecycles, and, techniques for supporting the real-time monitoring of safety requirements during operation.
- Develop and demonstrate prognostic decision support tools and methods capable of supporting real-time safety assurance.



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